# ATTACHMENT D

Soil Series Descriptions

LOCATION ASPOCKET CA

Established Series
Rev. EWB-JVC
05/2006

# ASPOCKET SERIES

The Aspocket series consists of deep, well drained soils that formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Aspocket soils are on mountains. Slopes are 4 to 30 percent. The mean annual precipitation is about 30 inches and the mean annual temperature is about 40 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, isotic Pachic Argicryolls

**TYPICAL PEDON:** Aspocket gravelly sandy loam--forest land. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 15 percent gravel and 3 percent stones.

**A1**--0 to 5 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist, moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine and fine tubular and interstitial pores; 15 percent gravel and 5 percent stones; neutral; clear wavy boundary. (3 to 7 inches thick)

**A2**--5 to 13 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine through coarse roots; common very fine tubular and interstitial pores; 25 percent gravel and 10 percent stones; neutral; clear wavy boundary. (5 to 12 inches thick)

**Bt1**--13 to 22 inches; brown (7.5YR 5/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and common fine through coarse roots; common very fine tubular and interstitial pores; common faint clay bridges between sand grains; 25 percent gravel and 20 percent stones; slightly acid; clear wavy boundary. (7 to 12 inches thick)

**Bt2**--22 to 38 inches; brown (7.5YR 5/3) very stony clay loam, dark brown (7.5YR 3/3) moist; strong medium subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; common very fine through coarse roots; common very fine tubular and interstitial pores; common distinct clay films on faces of peds and lining pores; 30 percent gravel and 25 percent stones; slightly acid; clear wavy boundary. (8 to 20 inches thick)

**2Bt3**--38 to 54 inches; brown (7.5YR 5/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; few very fine and common fine through coarse roots; common very fine tubular and interstitial pores; common distinct clay films on faces of peds and lining pores; 15 percent gravel and 5 percent cobbles; 30 percent paragravel; slightly acid. (10 to 18 inches thick)

**2Cr**--54 to 64 inches; weathered andesitic tuff.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 0.75 mile north of the Fire Lookout on Leviathan Peak; approximately 1,100 feet north and 700 feet east of the southwest corner of section 19, T. 10 N., R. 21 E.; USGS Topaz Lake 7.5 minute topographic quadrangle; 38 degrees 41 minutes 44.7 seconds north latitude and 119 degrees 36 minutes 36.7 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October; Xeric moisture regime.

Mean annual soil temperature - 44 to 47 degrees F.

Mean summer soil temperature - 47 to 52 degrees F.

Mollic epipedon thickness - 30 to 50 inches, includes the Bt1 and Bt2 horizons.

Depth to base of argillic horizon - 40 to 60 inches.

Depth to bedrock - 40 to 60 inches to a paralithic contact. The paralithic materials below the contact are weathered volcanic rock such as andesitic tuff.

Sodium fluoride pH - 8.5 to 9.5.

Particle-size control section - Clay content: Averages 18 to 27 percent; Rock fragments: Averages 35 to 60 percent. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizons - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 1 or 2, dry or moist.
Organic matter content: 5 to 8 percent.
Reaction: Slightly acid or neutral.

Bt1 and Bt2 horizons - Hue: 10YR or 7.5YR.

Chroma: 2 or 3, dry or moist.
Texture: Very stony loam or very stony clay loam.
Clay content: 18 to 27 percent.
Rock fragments: 35 to 60 percent.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

2Bt3 horizon - Hue: 10YR or 7.5YR.
Value: 5 or 6 dry, 4 or 5 moist.
Chroma: 4 or 6 dry or moist.
Texture: Gravelly clay loam, very gravelly clay loam, or very gravelly loam.
Clay content: 25 to 35 percent.
Rock fragments: 15 to 50 percent.
Pararock fragments: 15 to 30 percent paragravel.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** There are currently no other series in this family.

**GEOGRAPHIC SETTING:** Aspocket soils are on mountains. They typically occur on footslope positions. They formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Slopes are 4 to 30 percent. Elevations range from 7,000 to 10,000 feet. The climate is subhumid-continental with cold, moist winters and cool, dry summers. The mean annual precipitation is 20 to 45 inches, mean annual temperature is 36 to 43 degrees F., and the frost-free period is 30 to 60 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Celeridge, Monibasin, and Vermdig soils. Celeridge soils are shallow to lithic contacts and have mixed mineralogy. Monibasin soils are very deep and have mixed mineralogy. Vermdig soils have mollic epipedons less than 16 inches thick, have aquic conditions within 40 inches of the soil surface during the spring and early summer, and have mixed mineralogy.

**DRAINAGE AND PERMEABILITY:** Well drained; medium surface runoff; moderately slow permeability (moderately high saturated hydraulic conductivity).

**USE AND VEGETATION:** Aspocket soils are used for forest land, recreation, watershed, and wildlife habitat. The native vegetation is mainly a forest canopy of quaking aspen with an understory of snowberry, mountain brome, and bluegrass.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 4,200 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 38 inches (A1, A2, Bt1, and Bt2 horizons).

Argillic horizon - The zone from 13 to 54 inches (Bt1, Bt2, and 2Bt3 horizons).

Paralithic contact - The boundary at 54 inches to underlying soft, weathered bedrock (2Cr layer).

Particle-size control section - The zone from 13 to 33 inches (Bt1 horizon and part of the Bt2 horizon).

The isotic mineralogy class is based on the field determined values for sodium fluoride pH.

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National Cooperative Soil Survey
U.S.A.

LOCATION BAGVAL CA

Established Series
Rev. EWB-JVC
05/2006

# BAGVAL SERIES

The Bagval series consists of very deep, well drained and moderately well drained soils that formed in alluvium derived from altered tuff, tuff-breccia, and andesite. Bagval soils are on fan remnants and low stream terraces. Slopes are 0 to 8 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Fine, smectitic, frigid Typic Haploxererts

**TYPICAL PEDON:** Bagval clay loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 25 percent gravel.

**A**--0 to 2 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, moderately sticky and moderately plastic; few very fine roots; common very fine interstitial pores; 10 percent gravel; neutral; abrupt wavy boundary. (1 to 3 inches thick)

**Bt**--2 to 9 inches; brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate medium prismatic structure parting to strong fine angular blocky; many very fine and fine roots; common very fine tubular and interstitial pores; prominent pressure cutans on faces of peds; 1 to 2 cm wide vertical cracks; 5 percent gravel; slightly acid; clear wavy boundary. (5 to 10 inches thick)

**Btss**--9 to 30 inches; brown (7.5YR 5/2) clay, dark brown (7.5YR 3/2) moist; strong coarse prismatic parting to strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine through medium roots; common very fine tubular and interstitial pores; 40 percent intersecting slickensides bounding wedge-shaped peds; 1 to 2 cm wide vertical cracks; 10 percent gravel; neutral; clear wavy boundary. (14 to 30 inches thick)

**Btkss1**--30 to 45 inches; brown (7.5YR 5/2) clay, dark brown (7.5YR 3/2) moist; strong coarse prismatic structure parting to strong medium and coarse angular blocky; very hard, very firm, very sticky and very plastic; common very fine through medium roots; few very fine tubular and interstitial pores; many (40 percent) intersecting slickensides bounding wedge-shaped peds; 1 to 2 cm wide vertical cracks; 10 percent gravel; secondary carbonates segregated as common fine and medium masses; noneffervescent matrix and strongly effervescent carbonate masses; neutral; clear wavy boundary. (12 to

20 inches thick)

**Btkss2**--45 to 60 inches; brown (7.5YR 5/3) clay, dark brown (7.5YR 3/3) moist; strong medium prismatic structure parting to strong medium and coarse angular blocky; very hard, firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular and interstitial pores; common intersecting slickensides bounding wedge-shaped peds; 10 percent gravel; secondary carbonates segregated as many fine and medium masses; noneffervescent matrix and strongly effervescent carbonate masses; moderately alkaline.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 2.2 miles south of Heenan Lake; approximately 1,900 feet north and 500 feet west of the southeast corner of section 22, T. 9 N., R. 21 E.; USGS Wolf Creek 7.5 minute topographic quadrangle; 38 degrees 36 minutes 39.1 seconds north latitude and 119 degrees 38 minutes 59.9 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during fall, winter, and spring; usually dry from July through early October; adjacent soils have Xeric moisture regime.

Mean annual soil temperature - 44 to 47 degrees F.

Mean summer soil temperature - 62 to 65 degrees F.

Mollic epipedon thickness - 30 to 60 inches.

Depth to horizons with secondary carbonates - 30 to 40 inches.

**Cracks**- 1 to 2 cm wide vertical cracks are present in the upper 30 to 45 inches and are open from July to October in most years.

Particle-size control section - Clay content: 45 to 60 percent; Rock fragments: Averages less than 15 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizon - Hue: 7.5YR or 10YR.
Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Bt horizon - Hue: 7.5YR or 10YR.
Value: 4 or 5 dry, 2 or 3 moist.

Chroma: 1 or 2, dry or moist.
Clay content: 45 to 60 percent.
Rock fragments: 0 to 15 percent.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Btss horizon - Hue: 7.5YR or 10YR.
Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 1 or 2, dry or moist.
Clay content: 45 to 60 percent.
Rock fragments: 0 to 15 percent.
Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

Btkss horizons - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 1 or 2, dry or moist.
Clay content: 45 to 60 percent.
Rock fragments: 0 to 15 percent.
Organic matter content: 1 or 2 percent.
Reaction: Neutral through moderately alkaline.
Identifiable secondary carbonates: Occurs as few to many masses or filaments.
Calcium carbonate equivalent: 1 to 5 percent.

**COMPETING SERIES:** These are the Frenchollow (T), Hawkins, Obnot, and Obray series.

Frenchollow soils have mollic epipedons less than 30 inches thick, have cambic horizons, and have secondary carbonates at depths greater than 40 inches. Hawkins soils do not have argillic horizons and have lower subhorizons with hue of 10YR or 2.5Y. Obnot soils do not have argillic horizons and have mollic epipedons 12 to 23 inches thick. Obray soils do not have argillic horizons and have mean summer soil temperature of 65 to 68 degrees F.

**GEOGRAPHIC SETTING:** Bagval soils are on fan remnants and low stream terraces. They formed in alluvium derived from altered tuff, tuff-breccia, and andesite. Slopes are 0 to 8 percent. Elevations range from 6,000 to 7,000 feet. The climate is subhumid-continental with cold, moist winters and warm, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 40 to 44 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Heenlake, Loope, and Wetbag soils. Heenlake and Loope soils are loamy-skeletal. Wetbag soils have aquic conditions within the upper part of the profile during part of the growing season.

**DRAINAGE AND PERMEABILITY:** Well drained and moderately well drained; medium surface runoff; very slow permeability (low or moderately low saturated hydraulic conductivity). Endosaturation is present in the moderately well drained phase with an apparent seasonal high water table between 3.3 and 5 feet (deep free water occurrence class) between November and July. Cumulative annual duration class is Persistent. These soils are susceptible to rare flooding for extremely brief periods year-round.

**USE AND VEGETATION:** Bagval soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly low sagebrush, bottlebrush squirreltail, and bluegrass. The vegetative phase on low stream terraces is dominated by silver sagebrush.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 180 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 60 inches (A, Bt, Btss, Btkss1, and Btkss2 horizons).

Argillic horizon - The zone from 2 to 60 inches (Bt, Btss, Btkss1, and Btkss2 horizons).

Slickensides - The zone from 9 to 60 inches (Btss, Btkss1, and Btkss2 horizons).

Identifiable secondary carbonates - The zone from 30 to 60 inches (Btkss1 and Btkss2 horizons).

Particle-size control section - The zone from 10 to 40 inches (parts of the Btss and Btkss1 horizons).

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National Cooperative Soil Survey
U.S.A.

LOCATION CHENHIGH CA

Established Series
Rev. EWB-JVC
05/2006

# CHENHIGH SERIES

The Chenhigh series consists of shallow, well drained soils that formed in residuum derived from tuff, tuff-breccia, and andesite. Chenhigh soils are on mountains. Slopes are 4 to 30 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Clayey-skeletal, mixed, superactive, frigid Lithic Argixerolls

**TYPICAL PEDON:** Chenhigh very gravelly sandy loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 30 percent gravel, 5 percent cobbles, and 5 percent stones.

**A**--0 to 3 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular and interstitial pores; 45 percent gravel, 5 percent cobbles and 5 percent stones; slightly acid; abrupt wavy boundary. (2 to 5 inches thick)

**Bt1**--3 to 6 inches; dark grayish brown (10YR 4/2) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine and fine roots; common very fine and fine tubular and interstitial pores; many distinct clay films on faces of peds and lining pores; 45 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary. (2 to 3 inches thick)

**Bt2**--6 to 10 inches; brown (10YR 4/3) very gravelly clay, dark brown (10YR 3/3) moist; strong fine and medium angular blocky structure; very hard, firm, very sticky and very plastic; common very fine through medium roots; common very fine tubular and interstitial pores; many distinct clay films on faces of peds and lining pores; 45 percent gravel and 5 percent cobbles; neutral; clear wavy boundary. (3 to 6 inches thick)

**Bt3**--10 to 18 inches; brown (7.5YR 5/3) extremely gravelly clay, brown (7.5YR 4/3) moist; strong fine and medium angular blocky structure; common very fine through medium roots; common very fine tubular and interstitial pores; many prominent clay films on faces of peds and lining pores; 70 percent

gravel and 5 percent cobbles; neutral; clear irregular boundary. (3 to 8 inches thick)

**R**--18 inches; hard, fractured andesitic tuff.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 0.6 mile north of Heenan Lake; approximately 300 feet north and 900 feet east of the southwest corner of section 34, T. 10 N., R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 39 minutes 49.0 seconds north latitude and 119 degrees 39 minutes 53.8 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October for 75 to 90 consecutive days in the four months following the summer solstice; Xeric moisture regime that borders on aridic.

Mean annual soil temperature - 44 to 47 degrees F.

Mollic epipedon thickness - 7 to 14 inches; includes the Bt1 and Bt2 horizons.

Depth to bedrock - 14 to 20 inches to a lithic contact.

Particle-size control section - Clay content: Averages 35 to 50 percent; Rock fragments: Averages 50 to 80 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizon - Value: 4 or 5 dry.
Chroma: 2 or 3, dry or moist.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Bt1 horizon - Hue: 10YR or 7.5YR.
Value: 4 or 5 dry.
Chroma: 2 or 3, dry or moist.
Texture: Very gravelly clay loam or very gravelly clay.
Clay content: 30 to 45 percent.
Rock fragments: 35 to 60 percent.
Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

Bt2 horizon - Hue: 10YR or 7.5YR.
Value: 4 or 5 dry.
Chroma: 2 or 3, dry or moist.

Texture: Very gravelly clay loam, very gravelly clay, or extremely gravelly clay.
Clay content: 35 to 50 percent.
Rock fragments: 50 to 80 percent.
Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

Bt3 horizon - Hue: 10YR or 7.5YR.
Value: 4 through 6 dry, 4 or 5 moist.
Chroma: 3 or 4, dry or moist.
Texture: Very gravelly clay loam, very gravelly clay, or extremely gravelly clay.
Clay content: 35 to 50 percent.
Rock fragments: 50 to 80 percent.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** There are currently no other series in this family.

**GEOGRAPHIC SETTING:** Chenhigh soils are on mountains. They typically occur on summit or shoulder positions. They formed in residuum derived from tuff, tuff-breccia, and andesite. Slopes are 4 to 30 percent. Elevations range from 6,500 to 8,000 feet. The climate is subhumid-continental with cold, moist winters and warm, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Celeridge, Heenlake, Leroman, and Loope soils. These soils are loamy-skeletal. In addition, Heenlake and Leroman soils are moderately deep to paralithic contacts.

**DRAINAGE AND PERMEABILITY:** Well drained; very high surface runoff; slow permeability (moderately low or moderately high saturated hydraulic conductivity).

**USE AND VEGETATION:** Chenhigh soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly low sagebrush, antelope bitterbrush, currant, bluegrass, western needlegrass, and mountain brome.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 4,500 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 10 inches (A, Bt1, and Bt2 horizons).

Argillic horizon - The zone from 3 to 18 inches (Bt1, Bt2, and Bt3 horizons).

Lithic contact - The boundary at 18 inches to underlying hard bedrock (R layer).

Particle-size control section - The zone from 3 to 18 inches (Bt1, Bt2, and Bt3 horizons).

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National Cooperative Soil Survey
U.S.A.

LOCATION GERDOG CA

Established Series
Rev. EWB-JVC
05/2006

# GERDOG SERIES

The Gerdog series consists of very shallow and shallow, well drained soils that formed in colluvium and residuum derived from andesite, tuff, and tuff-breccia. Gerdog soils are on mountains. Slopes are 4 to 30 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, superactive, frigid Lithic Argixerolls

**TYPICAL PEDON:** Gerdog very gravelly sandy loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 30 percent gravel, 5 percent cobbles, and 4 percent stones.

**A**--0 to 3 inches; grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and common fine roots; common very fine interstitial and tubular pores; 40 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary. (1 to 5 inches thick)

**Bt1**--3 to 7 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; few faint clay films bridging sand grains; 40 percent gravel; slightly acid; clear wavy boundary. (3 to 5 inches thick)

**Bt2**--7 to 9 inches; brown (7.5YR 5/3) very gravelly loam, dark brown (7.5YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine and fine roots; common very fine interstitial and tubular pores; common faint clay films bridging sand grains; 40 percent gravel; slightly acid; clear wavy boundary. (2 to 4 inches thick)

**Bt3**--9 to 11 inches; brown (7.5YR 5/3) very gravelly sandy clay loam, dark brown (7.5YR 3/3) moist; moderate fine and medium subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; common very fine and fine roots; common very fine interstitial and tubular pores;

common distinct clay films on faces of peds and lining pores; 40 percent gravel; 30 percent paragravel; slightly acid; clear irregular boundary. (0 to 3 inches thick)

**R**--11 to 16 inches; hard andesite; slightly weathered in the upper part.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 1.5 miles south-southeast of the Leviathan Mine; approximately 1,600 feet south and 2,200 feet east of the northwest corner of section 26, T. 10 N, R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 41 minutes 14.3 seconds north latitude and 119 degrees 38 minutes 29.7 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October for 75 to 90 consecutive days in the four months following the summer solstice; Xeric moisture regime that borders on aridic.

Mean annual soil temperature - 44 to 47 degrees F.

Mean summer soil temperature - 62 to 66 degrees F.

Mollic epipedon thickness - 7 to 14 inches, includes the Bt horizons.

Depth to bedrock - 7 to 14 inches to a lithic contact.

Sodium fluoride pH - 8.5 to 9.0.

Particle-size control section - Clay content: Averages 18 to 25 percent; Rock fragments: Averages 35 to 60 percent, mainly gravel. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizon - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Rock fragments: 35 to 60 percent.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Bt horizons - Hue: 10YR or 7.5YR.
Chroma: 2 or 3, dry or moist.
Texture: Very gravelly sandy clay loam or very gravelly sandy loam.
Clay content: 18 to 27 percent.
Rock fragments: 35 to 50 percent.

Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** These are the Bellenmine, Celeridge, Cleavage, Cleavmor, Cropper, Gabica, Gaciba, Genoa, Gidwin, Grosschat, Hawkridge, Hutchley, Loope, Mascamp, Melling, Pernog, Pernty, Rozara, Shalcleav, Shalper, Slatter (T), Tractuff, and Tweener series.

Bellenmine, Cleavage, Cleavmor, Cropper, Gaciba, Grosschat, Mascamp, Pernty, Shalper, Slatter, Tractuff, and Tweener soils have an aridic moisture regime. Celeridge, Gabica, Gidwin, and Loope soils have lithic contacts at depths of 14 to 20 inches. Genoa soils are dominated by cobbles in the particle-size control section and have rock fragments that are granitic rocks. Hawkridge soils have mean summer soil temperature of 59 to 62 degrees F. Hutchley soils have subhorizons of the argillic horizon with 28 to 35 percent clay. Melling soils are dry for 45 to 60 consecutive days in the four months following the summer solstice. Pernog soils are dominated by stones and have more than 27 percent clay in some part of the particle-size control section. Rozara soils are dominated by fine gravel, have rock fragments that are granitic rocks, and have 14 to 18 percent clay in the particle-size control section. Shalcleav soils are dominated by channers and flagstones.

**GEOGRAPHIC SETTING:** Gerdog soils are on mountains. They typically occur on summit and shoulder positions. These soils formed in colluvium and residuum derived from andesite, tuff, and tuff-breccia. Slopes are 4 to 30 percent. Elevations range from 6,500 to 8,000 feet. The climate is subhumid-continental with cold, moist winters and warm, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Celeridge and Loope soils and the Joecut soil. Joecut soils are very deep and have umbric epipedons.

**DRAINAGE AND PERMEABILITY:** Well drained; very high surface runoff; moderately slow permeability (moderately high saturated hydraulic conductivity).

**USE AND VEGETATION:** Gerdog soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly low sagebrush, bluegrass, bottlebrush squirreltail, and antelope bitterbrush.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 2,400 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 11 inches (A, Bt1, Bt2, and Bt3 horizons).

Argillic horizon - The zone from 3 to 11 inches (Bt1, Bt2, and Bt3 horizons).

Lithic contact - The boundary at 11 inches to underlying hard bedrock (R layer).

Particle-size control section - The zone from the soil surface to 11 inches (A, Bt1, Bt2, and Bt3 horizons).

The revision of October 2003 updated the taxonomic class from Loamy-skeletal, isotic, frigid Lithic Argixerolls. The isotic mineralogy class was based solely on the field determined values for sodium fluoride pH. Laboratory data on 15 bar water to clay ratio does not exist to verify the isotic mineralogy class.

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National Cooperative Soil Survey
U.S.A.

LOCATION HEENLAKE CA

Established Series
Rev. EWB-JVC
05/2006

# HEENLAKE SERIES

The Heenlake series consists of moderately deep, well drained soils that formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Heenlake soils are on mountains. Slopes are 8 to 50 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, superactive, frigid Typic Argixerolls

**TYPICAL PEDON:** Heenlake very stony loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 20 percent gravel, 10 percent cobbles, and 8 percent stones.

**A**--0 to 6 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular and interstitial pores; 25 percent gravel, 10 percent cobbles, and 10 percent stones; slightly acid; clear wavy boundary. (3 to 7 inches thick)

**Bt1**--6 to 13 inches; dark grayish brown (10YR 4/2) very gravelly clay loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; common very fine through medium roots; common very fine tubular and interstitial pores; many distinct clay films on faces of peds and lining pores; 40 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary. (3 to 8 inches thick)

**Bt2**--13 to 18 inches; dark grayish brown (10YR 4/2) very gravelly clay loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; common very fine through coarse roots; common very fine tubular and interstitial pores; many distinct clay films on faces of peds and lining pores; 40 percent gravel and 5 percent cobbles; 5 percent paragravel and 5 percent paracobbles; neutral; clear wavy boundary. (4 to 8 inches thick)

**Bt3**--18 to 22 inches; 70 percent brown (7.5YR 5/4) and 30 percent grayish brown (10YR 5/2) very gravelly clay loam, 70 percent dark brown (7.5YR 3/4) and 30 percent very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; common very fine through coarse roots; common very fine tubular and interstitial pores; many distinct clay films on faces of peds and

lining pores; 40 percent gravel; 10 percent paragravel; neutral; clear irregular boundary. (4 to 20 inches thick)

**Cr**--22 to 32 inches; weathered andesitic tuff.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 0.4 mile south of Heenan Lake; approximately 1,650 feet north and 1,500 feet west of the southeast corner of section 10, T. 9 N., R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 38 minutes 16.2 seconds north latitude and 119 degrees 39 minutes 16.6 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October for 75 to 90 consecutive days in the four months following the summer solstice; Xeric moisture regime that borders on aridic.

Mean annual soil temperature - 44 to 47 degrees F.

Mollic epipedon thickness - 10 to 20 inches; includes the Bt1 and Bt2 horizons.

Depth to base of argillic horizon - 20 to 40 inches.

Depth to bedrock - 20 to 40 inches to a paralithic contact. The paralithic materials below the contact are weathered volcanic rocks such as andesitic tuff.

Sodium fluoride pH - 8.5 to 9.0.

Particle-size control section - Clay content: Averages 25 to 35 percent; Rock fragments: Averages 35 to 60 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizon - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Bt1 and Bt2 horizons - Hue: 10YR or 7.5YR.
Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Texture: Very gravelly clay loam, very gravelly loam, or very gravelly sandy clay loam.
Clay content: 25 to 30 percent.
Rock fragments: 35 to 60 percent.

Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

Bt3 horizon - Hue: 10YR or 7.5YR.
Value: 3 through 5 moist.
Texture: Very gravelly clay loam or very gravelly sandy clay loam.
Clay content: 27 to 35 percent.
Rock fragments: 35 to 60 percent.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** These are the Clanalpine, Devaul (T), Elaero, Heechee, Holmes, Horrocks, Hoskin, Howcan, Longday, Pequop, Squawtip, Suak, Valmar, Vitale, and Wambolt series.

Clanalpine soils typically have mollic epipedons that do not include the Bt horizons and are dominated by cobbles in the particle-size control section. Devaul soils are deep to paralithic contacts. Elaero soils average 12 to 18 percent clay in the particle-size control section, have rock fragments that are granitic rocks, and have paralithic material of weathered granitic rock in the series control section. Heechee, Holmes, Howcan, Longday, Pequop, and Wambolt soils are very deep. Horrocks soils are deep to lithic contacts. Hoskin, Suak, Valmar, and Vitale soils are moderately deep to lithic contacts. Squawtip soils average 18 to 25 percent clay in the particle-size control section.

**GEOGRAPHIC SETTING:** Heenlake soils are on mountains. They typically occur on footslope and backslope positions. They formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Slopes are 8 to 50 percent. Elevations range from 6,200 to 8,000 feet. The climate is subhumid-continental with cold, moist winters and warm, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Celeridge, Chenhigh, and Joecut soils. Celeridge and Chenhigh soils have lithic contacts within 20 inches. Joecut soils are very deep and have umbric epipedons.

**DRAINAGE AND PERMEABILITY:** Well drained; high or very high surface runoff; moderately slow permeability (moderately high saturated hydraulic conductivity).

**USE AND VEGETATION:** Heenlake soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are moderately extensive. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 18 inches (A, Bt1, and Bt2 horizons).

Argillic horizon - The zone from 6 to 22 inches (Bt1, Bt2, and Bt3 horizons).

Paralithic contact - The boundary at 22 inches to underlying soft bedrock (Cr layer).

Particle-size control section - The zone from 6 to 22 inches (Bt1, Bt2, and Bt3 horizons).

The revision of October 2003 updated the taxonomic class from Loamy-skeletal, isotic, frigid Typic Argixerolls. The isotic mineralogy class was based solely on the field determined values for sodium fluoride pH. Laboratory data on 15 bar water to clay ratio does not exist to verify the isotic mineralogy class.

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National Cooperative Soil Survey
U.S.A.

LOCATION JOECUT CA

Established Series
Rev. EWB-JVC
05/2006

# JOECUT SERIES

The Joecut series consists of very deep, moderately well drained or well drained soils that formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Joecut soils are on mountains. Slopes are 15 to 50 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, isotic, frigid Ultic Palexeralfs

**TYPICAL PEDON:** Joecut very gravelly peaty loam--forest land. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 15 percent gravel, 15 percent cobbles, 5 percent stones, and 5 percent boulders.

**Oi**--0 to 1 inch; slightly decomposed plant material composed of fibrous needle litter. (0 to 2 inches thick)

**A1**--1 to 2 inches; very dark gray (10YR 3/1) very gravelly peaty loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; 30 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary. (0 to 1 inches thick)

**A2**--2 to 5 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine interstitial and tubular pores; 30 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary. (2 to 7 inches thick)

**A3**--5 to 14 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine interstitial and tubular pores; 45 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary. (8 to 14 inches thick)

**Bt1**--14 to 22 inches; light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR

4/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine to medium and many coarse roots; common very fine interstitial and tubular pores; few distinct clay films on faces of peds and lining pores; 40 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary. (7 to 10 inches thick)

**Bt2**--22 to 40 inches; 70 percent light olive brown (2.5Y 5/4) and 30 percent brownish yellow (10YR 6/6) very gravelly clay loam, 70 percent olive brown (2.5Y 4/3) and 30 percent yellowish brown (10YR 5/6) moist; moderate fine and medium subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; few very fine and fine roots; common very fine interstitial and tubular pores; common distinct clay films on faces of peds and lining pores; 40 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary. (12 to 20 inches thick)

**Bt3**--40 to 60 inches; 70 percent brownish yellow (10YR 6/6) and 30 percent light olive brown (2.5Y 5/4) very cobbly clay loam, 70 percent yellowish brown (10YR 5/6) and 30 percent olive brown (2.5Y 4/3) moist; massive; hard, very friable, moderately sticky and moderately plastic; few very fine and fine roots; common very fine interstitial and tubular pores; common distinct clay films on rock fragments and lining pores; 25 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 1.5 miles south-southeast of the Leviathan Mine; approximately 1,800 feet north and 900 feet east of the southwest corner of section 26, T. 10 N., R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 40 minutes 55.6 seconds north latitude and 119 degrees 38 minutes 52.5 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from mid-July through September for 60 to 80 consecutive days in the four months following the summer solstice; Typic xeric moisture regime.

Mean annual soil temperature - 44 to 47 degrees F.

Umbric epipedon thickness - 10 to 20 inches.

Depth to base of argillic horizon - more than 60 inches.

Depth to bedrock - 60 to 80 inches to a paralithic contact. The paralithic materials below the contact are weathered volcanic rocks such as andesitic tuff.

Sodium fluoride pH - 8.5 to 9.5.

Particle-size control section - Clay content: Averages 25 to 35 percent; Rock fragments: Averages 35 to

50 percent. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizons - Value: 3 through 5 dry, 2 or 3 moist; dry value of 3 present only in the A1 horizon.
Chroma: 1 through 3, dry or moist; chroma of 1 present only in the A1 horizon.
Organic matter content: 10 to 15 percent in the A1 horizon (when present) and 2 to 8 percent in the A2 and A3 horizons, decreasing with depth.
Reaction: Moderately acid or slightly acid.

Bt horizons - Hue: 7.5YR through 2.5Y.
Value: 5 or 6 dry, 4 or 5 moist.
Chroma: 2 through 6, dry or moist.
Texture: Very gravelly loam, very gravelly clay loam, very gravelly sandy clay loam, or very cobbly clay loam.
Clay content: 25 to 35 percent.
Rock fragments: 35 to 50 percent.
Reaction: Moderately acid or slightly acid.
Other features: Some pedons have dual or variegated horizon matrix colors in lower subhorizons that may be redox concentrations of iron.

**COMPETING SERIES:** This is the Southcamp (T) series. Southcamp soils have albic horizons and are dominated by cobbles and stones in the particle-size control section.

**GEOGRAPHIC SETTING:** Joecut soils are on mountains. They typically occur on footslope and backslope positions. They formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Slopes are 15 to 50 percent. Elevations range from 6,000 to 8,000 feet. The climate is subhumid-continental with cold, moist winters and cool, dry summers. The mean annual precipitation is 20 to 30 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Aspocket, Celeridge, Gerdog, and Leroman soils. All of these soils have mollic epipedons. In addition Aspocket soils are deep to paralithic contacts. Celeridge and Gerdog soils have lithic contacts within 20 inches. Leroman soils are moderately deep to paralithic contacts.

**DRAINAGE AND PERMEABILITY:** Moderately well drained or well drained; high surface runoff; moderately slow permeability (moderately high saturated hydraulic conductivity). Endosaturation is present in a moderately well drained phase with an apparent seasonal high water table between 2.5 and 5 feet (moderately deep and deep free water occurrence classes) between March and June. Cumulative annual duration class is Transitory.

**USE AND VEGETATION:** Joecut soils are used for forest land, recreation, watershed, and wildlife habitat. The native vegetation are forest canopies of white fir and Sierra juniper on north-facing aspects

or Jeffrey pine on south-facing aspects with an understory of snowberry, bluegrass, and sedge.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are moderately extensive. MLRA 22A.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Organic soil material - The zone from the soil surface to 1 inch (Oi horizon).

Umbric epipedon - The zone from 1 to 14 inches (A1, A2, and A3 horizons).

Argillic horizon - The zone from 14 to 60 inches (Bt1, Bt2, and Bt3 horizons).

Particle-size control section - The zone from 14 to 34 inches (Bt1 horizon and part of the Bt2 horizon).

The isotic mineralogy class is based on the field determined values for sodium fluoride pH.

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National Cooperative Soil Survey
U.S.A.

LOCATION LEROMAN CA

Established Series
Rev. EWB-JVC
05/2006

# LEROMAN SERIES

The Leroman series consists of moderately deep, well drained soils that formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Leroman soils are on mountains. Slopes are 8 to 30 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, superactive, frigid Pachic Argixerolls

**TYPICAL PEDON:** Leroman very gravelly sandy loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 30 percent gravel, 5 percent cobbles, and 5 percent stones.

**A**--0 to 5 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; common very fine tubular and interstitial pores; 45 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary. (4 to 8 inches thick)

**Bt1**--5 to 16 inches; dark grayish brown (10YR 4/2) very gravelly sandy clay loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine through medium roots; common very fine tubular and interstitial pores; common faint clay films on ped faces and lining pores; 35 percent gravel and 10 percent cobbles; neutral; clear wavy boundary. (6 to 12 inches thick)

**Bt2**--16 to 23 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; very hard, friable, moderately sticky and moderately plastic; common very fine through medium roots; common very fine tubular and interstitial pores; many distinct clay films on faces of peds and lining pores; 40 percent gravel and 10 percent cobbles; neutral; clear wavy boundary. (5 to 12 inches thick)

**Bt3**--23 to 34 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, friable, moderately sticky and moderately plastic; few very fine and fine roots; few very fine tubular and interstitial pores; many distinct clay films

on faces of peds and lining pores; 40 percent gravel and 15 percent cobbles; neutral; clear wavy boundary. (5 to 12 inches thick)

**Cr**--34 to 43 inches; weathered ash-flow tuff.

**R**--43 inches; hard, unweathered ash-flow tuff.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 1.5 miles south of the Leviathan Mine; approximately 1,100 feet north and 1,600 feet east of the southwest corner of section 27, T. 10 N., R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 40 minutes 50.1 seconds north latitude and 119 degrees 39 minutes 43.9 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October for 75 to 90 consecutive days in the four months following the summer solstice; Xeric moisture regime that borders on aridic.

Mean annual soil temperature - 44 to 47 degrees F.

Mollic epipedon thickness - 20 to 30 inches; includes the Bt1 and Bt2 horizons.

Depth to base of argillic horizon - 20 to 40 inches.

Depth to bedrock - 20 to 40 inches to a paralithic contact. The paralithic materials below the contact are weathered volcanic rocks such as andesitic tuff.

Sodium fluoride pH - 8.5 to 9.0.

Particle-size control section - Clay content: Averages 18 to 27 percent; Rock fragments: Averages 35 to 60 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A horizon - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Organic matter content: 3 to 5 percent.
Reaction: Slightly acid or neutral.

Bt1 and Bt2 horizons - Hue: 10YR or 7.5YR.
Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.

Texture: Very gravelly sandy clay loam, very gravelly loam, or very gravelly sandy loam.
Clay content: 18 to 27 percent.
Rock fragments: 35 to 60 percent.
Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

Bt3 horizon - Hue: 10YR or 7.5YR.
Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Texture: Very gravelly sandy clay loam, very gravelly loam, or very gravelly sandy loam.
Clay content: 18 to 27 percent.
Rock fragments: 35 to 60 percent.
Organic matter content: 0.5 to 1 percent.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** These are the Bullump, Bullvaro, Burchflat, Camelback, Chrisflat, Demner (T), Dogbed, Dooh (T), Erig, Krenka, Lockgate, Murain, Nutval (T), Snyderville, Softback, Softscrabble, Staberg, Vetagrande, and Vipont series.

Bullump and Camelback soils have lithic contacts between 40 and 80 inches from the soil surface. Bullvaro, Demner, Dooh, Nutval, and Vetagrande soils have an aridic moisture regime. Burchflat and Vipont soils are moderately deep to lithic contacts. Chrisflat, Dogbed, Krenka, Murain, Snyderville, Softback, and Softscrabble soils are very deep. Erig soils are deep to lithic contacts. Lockgate soils are deep to paralithic contacts. Staberg soils have argillic horizons that are 6 to 15 inches thick, have the upper boundary of the argillic horizon at depths of 14 to 25 inches from the soil surface, and have C horizons overlying the paralithic contact.

**GEOGRAPHIC SETTING:** Leroman soils are on mountains. They typically occur on footslope and backslope positions. They formed in residuum and colluvium derived from tuff, tuff-breccia, and andesite. Slopes are 8 to 30 percent. Elevations range from 6,500 to 8,000 feet. The climate is subhumid-continental with cold, moist winters and warm, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Chenhigh, Celeridge, and Heenlake soils. Chenhigh and Celeridge soils are shallow to lithic contacts. Heenlake soils have mollic epipedons that are less than 20 inches thick.

**DRAINAGE AND PERMEABILITY:** Well drained; high surface runoff; moderately slow permeability (moderately high saturated hydraulic conductivity).

**USE AND VEGETATION:** Leroman soils are used for rangeland, recreation, watershed, and wildlife

habitat. The native vegetation is mainly mountain big sagebrush, antelope bitterbrush, snowberry, mountain brome, and western needlegrass.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 5,000 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 23 inches (A, Bt1, and Bt2 horizons).

Argillic horizon - The zone from 5 to 34 inches (Bt1, Bt2, and Bt3 horizons).

Paralithic contact - The boundary at 34 inches to underlying soft bedrock (Cr layer).

Particle-size control section - The zone from 5 to 25 inches (Bt1 and Bt2 horizons and part of the Bt3 horizon).

The revision of October 2003 updated the taxonomic class from Loamy-skeletal, isotic, frigid Pachic Argixerolls. The isotic mineralogy class was based solely on the field determined values for sodium fluoride pH. Laboratory data on 15 bar water to clay ratio does not exist to verify the isotic mineralogy class.

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National Cooperative Soil Survey
U.S.A.

LOCATION LOOPE CA

Established Series
Rev. EWB-JVC
05/2006

# LOOPE SERIES

The Loope series consists of shallow, well drained soils that formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Loope soils are on mountains. Slopes are 4 to 75 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, superactive, frigid Lithic Argixerolls

**TYPICAL PEDON:** Loope very gravelly sandy loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 30 percent gravel, 5 percent cobbles, and less than 1 percent stones.

**A**--0 to 1 inch; brown (7.5YR 5/2) very gravelly sandy loam, dark brown (7.5YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; common very fine tubular and interstitial pores; 50 percent gravel; neutral; clear smooth boundary. (1 to 3 inches thick)

**Bt1**--1 to 7 inches; brown (7.5YR 5/3) extremely gravelly sandy loam, dark brown (7.5YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine tubular and interstitial pores; few faint clay films bridging sand grains; 70 percent gravel and 5 percent cobbles; neutral; clear wavy boundary. (3 to 7 inches thick)

**Bt2**--7 to 14 inches; brown (7.5YR 5/3) extremely gravelly sandy clay loam, dark brown (7.5YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine through very coarse roots; common very fine tubular and interstitial pores; common faint clay films bridging sand grains; 70 percent gravel and 5 percent cobbles; neutral; clear irregular boundary. (6 to 10 inches thick)

**R**--14 inches; hard fractured tuff.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 0.4 mile northeast of Colorado Hill; approximately 600 feet south and 1,350 feet east of the northwest corner of section 32, T. 10 N., R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 40

minutes 24.4 seconds north latitude and 119 degrees 41 minutes 53.6 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October for 75 to 90 consecutive days in the four months following the summer solstice; Xeric moisture regime that borders on aridic.

Mean annual soil temperature - 44 to 47 degrees F.

Mean summer soil temperature - 62 to 66 degrees F.

Mollic epipedon thickness - 14 to 20 inches; includes the Bt horizons.

Depth to bedrock - 14 to 20 inches to lithic contact.

Sodium fluoride pH - 8.5 to 9.0.

Particle-size control section - Clay content: Averages 18 to 27 percent; Rock fragments: Averages 60 to 80 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, or andesite.

A horizon - Hue: 10YR or 7.5YR.
Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Bt horizons - Hue: 10YR or 7.5YR.
Chroma: 2 or 3, dry or moist.
Texture: Extremely gravelly sandy loam, extremely gravelly sandy clay loam, or extremely gravelly loam.
Clay content: 18 to 27 percent.
Rock fragments: 60 to 80 percent.
Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** These are the Bellenmine, Celeridge, Cleavage, Cleavmor, Cropper, Gabica, Gaciba, Genoa, Gerdog, Gidwin, Grosschat, Hawkridge, Hutchley, Mascamp, Melling, Pernog, Pernty, Rozara, Shalcleav, Shalper, Slatter (T), Tractuff, and Tweener series.

Bellenmine, Cleavage, Cleavmor, Cropper, Gaciba, Grosschat, Mascamp, Pernty, Shalper, Slatter, Tractuff, and Tweener soils have an aridic moisture regime. Celeridge soils have 5 to 8 percent organic matter in the A horizons and have mean summer soil temperatures of 59 to 62 degrees F. Gabica soils average 35 to 60 percent rock fragments in the particle-size control section and have 1 or 2 percent organic matter in the mollic epipedon. Genoa soils are dominated by cobbles in the particle-size control section and have rock fragments that are granitic rocks. Gerdog and Hawkridge soils have lithic contacts at depths of 7 to 14 inches. Gidwin soils are influenced by loess, have rock fragments that are basalt, and have frost-free periods of 70 to 110 days. Hutchley soils have subhorizons of the argillic horizon with 28 to 35 percent clay. Melling soils average 35 to 60 percent rock fragments in the particle-size control section and are dry for 45 to 60 consecutive days in the four months following the summer solstice. Pernog soils are dominated by stones and have more than 27 percent clay in some part of the particle-size control section. Rozara soils are dominated by fine gravel, have rock fragments that are granitic rocks, have 14 to 18 percent clay, and average 45 to 60 percent rock fragments in the particle-size control section. Shalcleav soils are dominated by channers and flagstones and have lithic contacts at depths of 4 to 12 inches.

**GEOGRAPHIC SETTING:** Loope soils are on mountains. They typically occur on backslope positions. They formed in colluvium and residuum derived from tuff, tuff-breccia, and andesite. Slopes are 4 to 75 percent. Elevations range from 6,000 to 8,000 feet. The climate is subhumid-continental with cold, moist winters and warm, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Carshal, Chenhigh, and Heenlake soils. Carshal soils have ochric epipedons and do not have argillic horizons. Chenhigh soils are clayey-skeletal. Heenlake soils are moderately deep to paralithic contacts.

**DRAINAGE AND PERMEABILITY:** Well drained; very high surface runoff; moderate permeability (moderately high or high saturated hydraulic conductivity).

**USE AND VEGETATION:** Loope soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with scattered singleleaf pinyon, Jeffrey pine, and Sierra juniper.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are moderately extensive. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 14 inches (A, Bt1, and Bt2 horizons).

Argillic horizon - The zone from 1 to 14 inches (Bt1 and Bt2 horizons).

Lithic contact - The boundary at 14 inches to underlying hard bedrock (R layer).

Particle-size control section - The zone from 1 to 14 inches (Bt1 and Bt2 horizons).

The revision of October 2003 updated the taxonomic class from Loamy-skeletal, isotic, frigid Lithic Argixerolls. The isotic mineralogy class was based solely on the field determined values for sodium fluoride pH. Laboratory data on 15 bar water to clay ratio does not exist to verify the isotic mineralogy class.

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National Cooperative Soil Survey
U.S.A.

LOCATION MONIBASIN CA

Established Series
Rev. EWB-JVC
05/2006

# MONIBASIN SERIES

The Monibasin series consists of very deep, well drained soils that formed in slope alluvium derived from andesite, tuff, and tuff-breccia. Monibasin soils are on mountains. Slopes are 4 to 15 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 40 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, superactive Pachic Argicryolls

**TYPICAL PEDON:** Monibasin gravelly sandy loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 20 percent gravel and 2 percent boulders.

**A1**--0 to 2 inches; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 20 percent gravel and 1 percent boulders; slightly acid; clear wavy boundary. (1 to 4 inches thick)

**A2**--2 to 7 inches; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; common very fine interstitial and tubular pores; 20 percent gravel; slightly acid; clear wavy boundary. (2 to 6 inches thick)

**A3**--7 to 15 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; 20 percent gravel; slightly acid; clear wavy boundary. (5 to 8 inches thick)

**Bt1**--15 to 34 inches; brown (7.5YR 5/3) extremely stony sandy loam, dark brown (7.5YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine interstitial and tubular pores; few faint clay bridges between sand grains; 20 percent gravel, 5 percent cobbles, and 50 percent stones; neutral; clear wavy boundary. (12 to 20 inches thick)

**Bt2**--34 to 60 inches; 90 percent pale brown (10YR 6/3) and 10 percent brown (7.5YR 5/3) very stony

sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine interstitial and tubular pores; few faint clay bridges between sand grains; 20 percent gravel, 10 percent cobbles, and 10 percent stones; neutral.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 0.5 mile west of Monitor Pass; approximately 1,000 feet south and about 900 feet east of the northwest corner of section 36, T. 10 N., R. 21 E.; USGS Heenan Lake 7.5 minute topographic quadrangle; 38 degrees 40 minutes 26.4 seconds north latitude and 119 degrees 37 minutes 43.2 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, and spring; dry from July through early October for 60 to 80 consecutive days in the four months following the summer solstice; Typic xeric moisture regime.

Mean annual soil temperature - 42 to 46 degrees F.

Mean summer soil temperature - 52 to 59 degrees F.

Mollic epipedon thickness - 26 to 36 inches, includes the Bt1 horizon.

Depth to base of argillic horizon - more than 60 inches.

Sodium fluoride pH - 8.5 to 9.0.

Particle-size control section - Clay content: Averages 18 to 25 percent; Rock fragments: Averages 60 to 80 percent, mainly stones. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, or andesite.

A horizons - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Bt1 horizon - Hue: 10YR or 7.5YR.
Texture: Extremely stony sandy loam or extremely stony sandy clay loam.
Clay content: 18 to 25 percent.
Rock fragments: 60 to 80 percent.
Organic matter content: 1 to 3 percent.
Reaction: Slightly acid or neutral.

Bt2 horizon - Hue: 10YR or 7.5YR.
Texture: Extremely stony sandy loam or very stony sandy clay loam.
Clay content: 18 to 25 percent.
Rock fragments: 35 to 80 percent.
Reaction: Slightly acid or neutral.

**COMPETING SERIES:** These are the Angelwhine, Aspetill, Badwater, Bickmore, Bluebell, Booneville, Buena Vista, Dab, Dailybasin (T), Delhew, Hawkinspeak, Keman, Littlemud (T), Lostcannon, Parkalley (T), Parkay, Redbird, Rutherford, Sweetmount, and Woodhurst series.

Angelwhine soils have mollic epipedons that are less than 24 inches thick and are dominated by gravel in the particle-size control section. Aspetill soils have mean summer soil temperature of 47 to 52 degrees F. and are dominated by cobbles in the particle-size control section. Badwater soils have 25 to 35 percent clay and are dominated by boulders in the particle-size control section. Bickmore, Bluebell, Buena Vista, Hawkinspeak, Littlemud, Rutherford, and Woodhurst soils are moderately deep to lithic contacts. Booneville soils have mean annual soil temperature of 36 to 40 degrees F. Dab soils are dominated by gravel in the particle-size control section. Dailybasin soils have an ustic moisture regime. Delhew soils have less than 18 percent clay, are dominated by fine gravel (2 to 5 mm diameter) in the particle-size control section, and have rock fragments that are granitic rocks. Keman soils are dominated by gravel in the particle-size control section and have mean annual soil temperature of 39 to 42 degrees F. Lostcannon soils have less than 18 percent clay in the particle-size control section and have rock fragments that are granitic rocks. Parkalley soils have the base of the argillic horizon between 28 and 35 inches from the soil surface and are dominated by flagstones. Parkay soils average 27 to 35 percent clay in the particle-size control section. Redbird soils average 27 to 35 percent clay in the particle-size control section and have horizons with identifiable secondary carbonates within 40 inches of the soil surface. Sweetmount soils are deep to paralithic contacts and have subhorizons of the argillic horizon with 27 to 50 percent clay.

**GEOGRAPHIC SETTING:** Monibasin soils are on mountains. They typically occur on footslope positions. They formed in slope alluvium derived from tuff, tuff-breccia, and andesite. Slopes are 4 to 15 percent. Elevations range from 7,500 to 8,500 feet. The climate is subhumid-continental with cold, moist winters and cool, dry summers. The mean annual precipitation is 16 to 24 inches, the mean annual temperature is 37 to 43 degrees F., and the frost-free period is 30 to 60 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Aspocket and Vermdig soils. Aspocket soils are deep to paralithic contacts and have mean summer soil temperature of 47 to 52 degrees F. Vermdig soils are fine-loamy and have a seasonal high water table within 30 to 40 inches of the soil surface.

**DRAINAGE AND PERMEABILITY:** Well drained; medium surface runoff; moderate permeability

(moderately high or high saturated hydraulic conductivity).

**USE AND VEGETATION:** Monibasin soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly mountain big sagebrush, Letterman's needlegrass, and sedge.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 580 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 34 inches (A1, A2, A3, and Bt1 horizons).

Argillic horizon - The zone from 15 to 60 inches (Bt1 and Bt2 horizons).

Particle-size control section - The zone from 15 to 35 inches (Bt1 horizon and part of the Bt2 horizon).

The revision of October 2003 updated the taxonomic class from Loamy-skeletal, isotic Pachic Argicryolls. The isotic mineralogy class was based solely on the field determined values for sodium fluoride pH. Laboratory data on 15 bar water to clay ratio does not exist to verify the isotic mineralogy class.

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National Cooperative Soil Survey
U.S.A.

LOCATION VERMDIG CA

Established Series
Rev. EWB-JVC
05/2006

# VERMDIG SERIES

The Vermdig series consists of very deep, somewhat poorly drained soils that formed in slope alluvium derived from andesite, tuff-breccia, and tuff. Vermdig soils are on mountains. Slopes are 2 to 8 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 40 degrees F.

**TAXONOMIC CLASS:** Fine-loamy, mixed, superactive Aquic Argicryolls

**TYPICAL PEDON:** Vermdig loam--rangeland. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with 10 percent gravel.

**A**--0 to 2 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine interstitial pores; moderately acid; clear smooth boundary. (1 to 3 inches thick)

**Bt1**--2 to 8 inches; brown (7.5YR 5/3) gravelly sandy clay loam, dark brown (7.5YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; few faint clay films bridging sand grains; many medium distinct brown (7.5YR 4/2) moist irregular zones of iron depletion; 20 percent gravel; moderately acid; clear smooth boundary. (3 to 8 inches thick)

**Bt2**--8 to 13 inches; brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine and fine roots; common very fine interstitial and tubular pores; few distinct clay films on faces of peds and lining pores; many medium distinct brown (7.5YR 4/2) moist irregular zones of iron depletion and few fine distinct brown (7.5YR 4/4) moist irregular masses of iron accumulation in the matrix; 20 percent gravel; slightly acid; clear smooth boundary. (4 to 9 inches thick)

**Bt3**--13 to 32 inches; light brown (7.5YR 6/3) gravelly loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; common very fine and fine roots; common very fine interstitial and tubular pores; few distinct clay films

on faces of peds and lining pores; common medium distinct brown (7.5YR 4/2) moist irregular zones of iron depletion; 20 percent gravel; slightly acid; clear smooth boundary. (11 to 19 inches thick)

**Bt4**--32 to 39 inches; light brown (7.5YR 6/3) gravelly clay loam, brown (7.5YR 4/3) moist; moderate fine and medium subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; few very fine and fine roots; common very fine interstitial and tubular pores; few distinct clay films on faces of peds and lining pores; common fine prominent strong brown (7.5YR 4/6) moist irregular masses of iron accumulation lining pores; 30 percent gravel; slightly acid; clear smooth boundary. (0 to 12 inches thick)

**Bt5**--39 to 60 inches; light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate fine and medium subangular blocky structure; very hard, friable, very sticky and moderately plastic; few very fine and fine roots; common very fine interstitial and tubular pores; common distinct clay films on faces of peds and lining pores; common fine prominent strong brown (7.5YR 4/6) moist irregular masses of iron accumulation lining pores; 15 percent gravel; slightly acid.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest about 0.5 mile west of Monitor Pass; approximately 2,000 feet south and 1,000 feet east of the northwest corner of section 36, T. 10 N., R. 21 E.; Heenan Lake USGS 7.5 minute topographic quadrangle; 38 degrees 40 minutes 19.2 seconds north latitude and 119 degrees 37 minutes 38.6 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually moist in the moisture control section during late fall, winter, spring, and early summer; usually dry from mid-July through September for 60 to 80 consecutive days in the four months following the summer solstice; occasionally saturated in the upper 6 to 15 inches during March to May, commonly saturated within 40 inches and occasionally saturated within 30 inches of the surface March to July; Typic xeric moisture regime.

Mean annual soil temperature - 44 to 47 degrees F.

Mean summer soil temperature - 52 to 59 degrees F.

Mollic epipedon thickness - 10 to 16 inches.

Depth to base of argillic horizon - more than 60 inches.

Sodium fluoride pH - 8.5 to 9.0.

Particle-size control section - Clay content: Averages 18 to 27 percent; Rock fragments: Averages 15 to 35 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as andesite, tuff-breccia, and tuff.

A horizon - Value: 4 or 5 dry, 2 or 3 moist.
Chroma: 2 or 3, dry or moist.
Organic matter content: 1 to 3 percent.
Reaction: Moderately acid or slightly acid.

Bt1 and Bt2 horizons - Hue: 10YR or 7.5YR.
Chroma: 2 or 3, dry or moist.
Texture: Gravelly sandy clay loam, gravelly sandy loam, or gravelly loam.
Clay content: 18 to 25 percent.
Rock fragments: 15 to 35 percent.
Organic matter content: 1 or 2 percent.
Reaction: Moderately acid or slightly acid.
Redoximorphic features: Redox concentrations occur as masses of iron or manganese accumulation in the matrix, and redox depletions occur as irregular zones of iron and manganese loss in the matrix.

Bt3, Bt4, and Bt5 horizons (when present) - Hue: 10YR or 7.5YR.
Chroma: 3 or 4, dry or moist.
Texture: Gravelly sandy clay loam, gravelly clay loam, or gravelly loam.
Clay content: 25 to 35 percent.
Rock fragments: 15 to 35 percent.
Reaction: Moderately acid or slightly acid.
Redoximorphic features: Redox concentrations occur as masses of iron or manganese accumulation in the matrix, and redox depletions occur as irregular zones of iron and manganese loss in the matrix.

**COMPETING SERIES:** This is the Animas series. Animas soils are moderately deep to paralithic contacts.

**GEOGRAPHIC SETTING:** Vermdig soils are on mountains. They typically occur on toeslope positions. They formed in slope alluvium derived from andesite, tuff, and tuff-breccia. Slopes are 2 to 8 percent. Elevations range from 7,500 to 8,500 feet. The climate is subhumid-continental with cold, moist winters and cool, dry summers. The mean annual precipitation is 16 to 24 inches, the mean annual temperature is 37 to 42 degrees F., and the frost-free period is 30 to 60 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Aspocket and Monibasin soils. Aspocket and Monibasin soils have mollic epipedons more than 16 inches thick and have bedrock within 40 to 60 inches of the soil surface.

**DRAINAGE AND PERMEABILITY:** Somewhat poorly drained; very high surface runoff; moderately slow permeability (moderately high saturated hydraulic conductivity). Endosaturation is present with an apparent seasonal high water table between 30 and 40 inches (moderately deep free water occurrence class) from March to July. Cumulative annual duration class is Common. Episaturation

is occasionally present within the upper 6 to 15 inches from March to May.

**USE AND VEGETATION:** Vermdig soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly silver sagebrush, bluegrass, and mat muhly.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 125 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 13 inches (A, Bt1, and Bt2 horizons).

Argillic horizon - The zone from 2 to 60 inches (Bt1, Bt2, Bt3, Bt4, and Bt5 horizons).

Aquic conditions - The conditions of endosaturation and reduction in horizons between 39 and 60 inches in normal years (Bt4 and Bt5 horizons).

Particle-size control section - The zone from 2 to 22 inches (Bt1 and Bt2 horizons and part of the Bt3 horizon).

The revision of October 2003 updated the taxonomic class from Fine-loamy, isotic Aquic Argicryolls. The isotic mineralogy class was based solely on the field determined values for sodium fluoride pH. Laboratory data on 15 bar water to clay ratio does not exist to verify the isotic mineralogy class.

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National Cooperative Soil Survey
U.S.A.

LOCATION WETBAG CA

Established Series
Rev. EWB-JVC
05/2006

# WETBAG SERIES

The Wetbag series consists of very deep, poorly drained and very poorly drained soils that formed in alluvium derived from tuff, tuff-breccia, and andesite. Wetbag soils are on fan remnants and low stream terraces. Slopes are 0 to 8 percent. The mean annual precipitation is about 20 inches and the mean annual temperature is about 42 degrees F.

**TAXONOMIC CLASS:** Fine, smectitic Vertic Cryaquolls

**TYPICAL PEDON:** Wetbag peaty silt loam--rangeland. (Colors are for moist soil unless otherwise noted.)

**A1**--0 to 2 inches; very dark brown (10YR 2/2) peaty silt loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; hard, friable, moderately sticky and moderately plastic; many very fine and common fine and medium roots; many very fine interstitial pores; neutral; clear wavy boundary. (1 to 4 inches thick)

**A2**--2 to 6 inches; black (10YR 2/1) clay, very dark gray (10YR 3/1) dry; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; many very fine and common fine and medium roots; many very fine and common fine tubular pores; common fine faint very dark gray (2.5Y 3/1) irregular zones of iron depletion and common fine prominent brown (7.5YR 4/4) irregular masses of iron accumulation in the matrix; 5 percent gravel; neutral; clear wavy boundary. (3 to 6 inches thick)

**Btg**--6 to 15 inches; very dark gray (2.5Y 3/1) clay, gray (2.5Y 5/1) dry; moderate fine subangular blocky structure; slightly hard, firm, very sticky and very plastic; common very fine and many fine and medium roots; common very fine and fine tubular pores; few faint clay films lining pores; few fine prominent brown (7.5YR 4/4) irregular masses of iron accumulation in the matrix; 5 percent gravel; neutral; clear wavy boundary. (7 to 12 inches thick)

**Btssg1**--15 to 26 inches; 60 percent black (N 2.5/0) and 40 percent dark gray (2.5Y 4/1) clay, 60 percent dark gray (N 4/0) and 40 percent gray (2.5Y 6/1) dry; moderate fine subangular blocky structure; hard, friable, very sticky and very plastic; common very fine through medium roots; many very fine and

common fine tubular pores; few slickensides; few faint clay films lining pores; few fine prominent dark yellowish brown (10YR 4/6) irregular masses of iron accumulation in the matrix; 5 percent gravel; neutral; clear wavy boundary. (8 to 17 inches thick)

**Btssg2**--26 to 46 inches; 75 percent dark gray (2.5Y 4/1) and 25 percent gray (2.5Y 5/1) clay, 75 percent gray (2.5Y 5/1) and 25 percent gray (2.5Y 6/1) dry; moderate fine and medium angular blocky structure; hard, friable, very sticky and very plastic; common very fine and few fine and medium roots; few slickensides; common pressure cutans on faces of peds and few faint clay films lining pores; common fine and medium prominent dark yellowish brown (10YR 4/6) irregular masses of iron accumulation in the matrix and few fine prominent pale green (5G 6/2) irregular zones of iron depletion in the matrix; 2 percent gravel; neutral; clear wavy boundary. (12 to 26 inches thick)

**B'tg**--46 to 60 inches; 60 percent dark gray (2.5Y 4/1) and 40 percent dark yellowish brown (10YR 4/4) clay, 60 percent gray (2.5Y 5/1) and 40 percent light yellowish brown (10YR 6/4) dry; weak fine and medium angular blocky structure; hard, friable, very sticky and very plastic; few very fine and fine roots; common very fine tubular and interstitial pores; common pressure cutans on faces of peds; common fine prominent greenish gray (5G 6/1) and few fine black (N 2.5/0) irregular zones of iron depletion within the matrix; areas with dark yellowish brown color are very coarse irregular masses of iron accumulation in the matrix; 10 percent gravel; neutral.

**TYPE LOCATION:** Alpine County, California; on the Toiyabe National Forest in Bagley Valley about 1.5 miles south of Heenan Lake; approximately 350 feet north and 1,500 feet west of the southeast corner of section 15, T. 9 N., R. 21 E.; USGS Wolf Creek 7.5 minute topographic quadrangle; 38 degrees 37 minutes 14.8 seconds north latitude and 119 degrees 39 minutes 11.4 seconds west longitude, NAD27.

**RANGE IN CHARACTERISTICS:**

Soil moisture - Usually saturated in some part of the moisture control section during winter, spring, and early summer, usually dry in some part summer and fall; seasonal periods of aquic moisture regime from November through June during saturation with ground water and anaerobic conditions; Aquic moisture regime.

Mean annual soil temperature - 44 to 47 degrees F.

Mean summer soil temperature - 55 to 59 degrees F.

Mollic epipedon thickness - 20 to 40 inches.

Depth to seasonal aquic conditions - 0 to 20 inches.

Particle-size control section - Clay content: Averages 35 to 50 percent; Rock fragments: Averages 0 to

15 percent, mainly pebbles. Lithology of fragments are volcanic rocks such as tuff, tuff-breccia, and andesite.

A1 horizon - Hue: 10YR or neutral (N).
Value: 3 or 4 dry, 2 or 3 moist.
Chroma: 0 (if hue is Neutral) through 2, dry or moist.
Organic matter content: 10 to 15 percent.
Reaction: Slightly acid or neutral.
Redoximorphic features: Redox concentrations occur as masses of iron or manganese accumulation in the matrix; redox depletions may occur as zones of iron or manganese removal in the matrix.

A2 horizon - Hue: 10YR or neutral (N).
Value: 2 or 3 moist, 3 or 4 dry.
Chroma: 0 (if hue is Neutral) through 2, moist or dry.
Organic matter content: 5 to 8 percent.
Reaction: Slightly acid or neutral.

Btg horizon - Hue: 10YR, 2.5Y, or neutral (N).
Value: 2 or 3 moist, 4 or 5 dry.
Chroma: 0 (if hue is Neutral) through 2, moist or dry.
Texture: Clay or clay loam.
Rock fragments: 0 to 15 percent, dominantly pebbles.
Organic matter content: 2 to 4 percent.
Reaction: Slightly acid or neutral.

Btssg1 horizon - Hue: 10YR, 2.5Y, or neutral (N).
Value: 2 through 4 moist, 4 through 6 dry.
Chroma: 0 (if hue is Neutral) through 2, moist or dry.
Texture: Clay or clay loam.
Rock fragments: 0 to 15 percent, dominantly pebbles.
Organic matter content: 1 or 2 percent.
Reaction: Slightly acid or neutral.
Redoximorphic features: Redox concentrations occur as masses of iron or manganese accumulation in the matrix; redox depletions may occur as zones of iron or manganese removal in the matrix.

Btssg2 and B'tg horizons - Hue: 10YR, 2.5Y, or neutral (N).
Value: 2 through 4 moist, 4 through 6 dry.
Chroma: 0 (if hue is Neutral) through 2, moist or dry.
Texture: Clay or clay loam.
Rock fragments: 0 to 15 percent, dominantly pebbles.
Reaction: Slightly acid or neutral.
Redoximorphic features: Redox concentrations occur as masses of iron or manganese accumulation in

the matrix; redox depletions may occur as zones of iron or manganese removal in the matrix.

**COMPETING SERIES:** These are the Egeria (T), Railway (T), and Silvies series.

Egeria soils do not have argillic horizons, do not have horizons with slickensides, and have mean annual soil temperature of 36 to 40 degrees F. Railway soils do not have argillic horizons, have mean summer soil temperatures that are less than 55 degrees F., and have a perched water table in the upper part of the profile. Silvies soils do not have argillic horizons, do not have horizons with slickensides, and are influenced by volcanic ash.

**GEOGRAPHIC SETTING:** Wetbag soils are on fan remnants and low stream terraces. They formed in alluvium derived from altered tuff, tuff-breccia, and andesite. Slopes are 0 to 8 percent. Elevations range from 6,000 to 7,000 feet. The climate is subhumid-continental with cold, moist winters and cool, dry summers. The mean annual precipitation is 16 to 24 inches, mean annual temperature is 39 to 45 degrees F., and the frost-free period is 40 to 70 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Bagval, Heenlake, and Loope soils. These soils have a xeric moisture regime. In addition, Heenlake soils are moderately deep to paralithic contacts and Loope soils are shallow to lithic contacts.

**DRAINAGE AND PERMEABILITY:** Poorly drained and very poorly drained; very high surface runoff; very slow permeability (low or moderately low saturated hydraulic conductivity). Endosaturation is present with an apparent seasonal high water table between the soil surface and 20 inches (very shallow or shallow free water occurrence classes) from November through June. Cumulative annual duration classes are Common or Persistent. Some areas of these soils are susceptible to occasional flooding for brief periods between December and June.

**USE AND VEGETATION:** Wetbag soils are used for rangeland, recreation, watershed, and wildlife habitat. The native vegetation is mainly rushes and sedges.

**DISTRIBUTION AND EXTENT:** Eastern California, on the east side of the Sierra Nevada Range. These soils are not extensive with about 70 acres of the series mapped to date. MLRAs 22A and 26.

**MLRA OFFICE RESPONSIBLE:** Reno, Nevada.

**SERIES ESTABLISHED:** Alpine County (Toiyabe National Forest Area), California, 2006.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - The zone from the soil surface to 26 inches (A1, A2, Btg, and Btssg1 horizons).

Argillic horizon - The zone from 6 to 60 inches (Btg, Btssg1, Btssg2, and B'tg horizons).

Slickensides - The zone from 15 to 46 inches (Btssg1 and Btssg2 horizons).

Aquic conditions - The conditions of endosaturation and reduction in horizons between the soil surface and 60 inches at certain times in normal years (A1, A2, Btg, Btssg1, Btssg2, and B'tg horizons).

Particle-size control section - The zone from 6 to 26 inches (Btg and Btssg1 horizons).

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